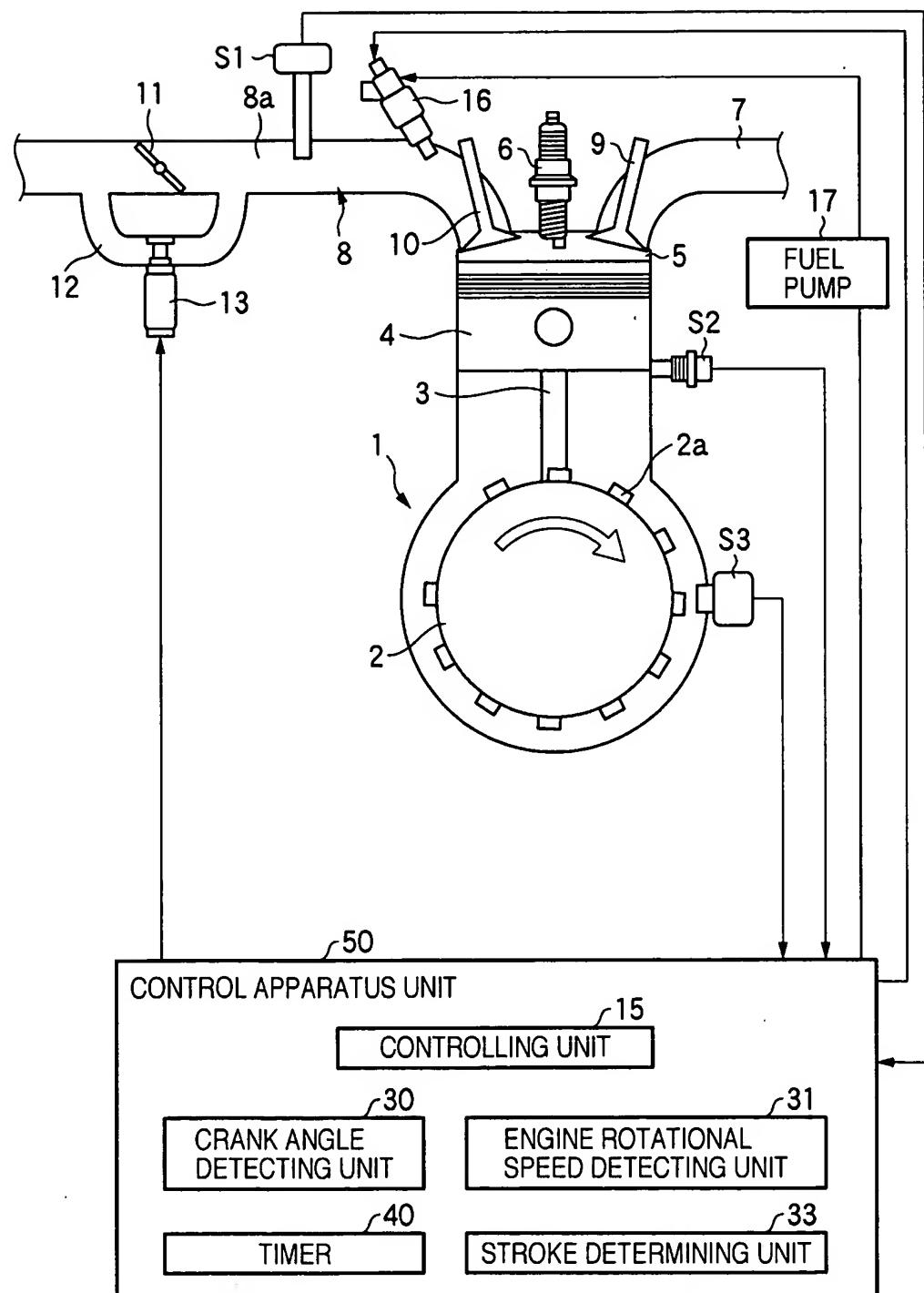


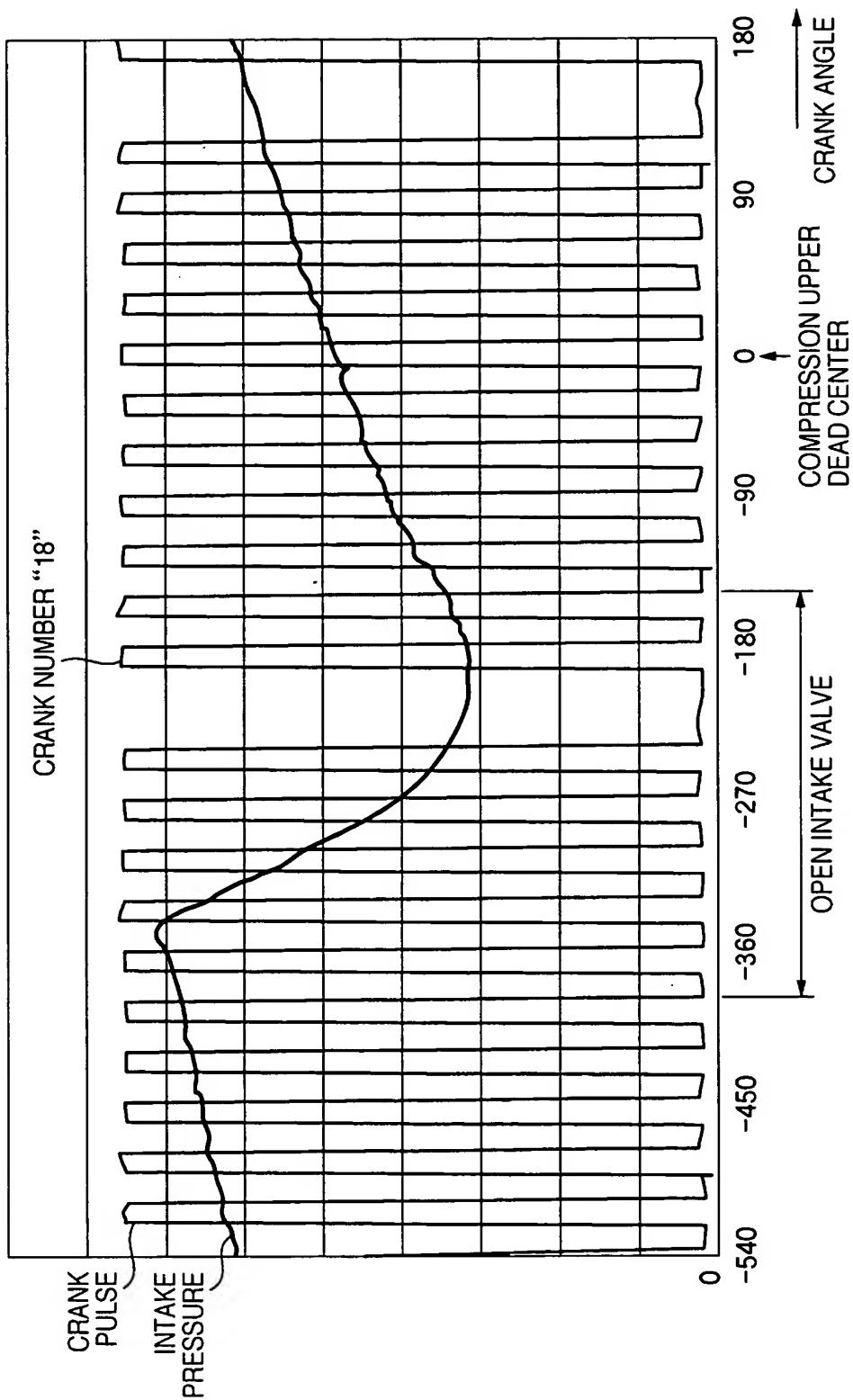
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FIG.1



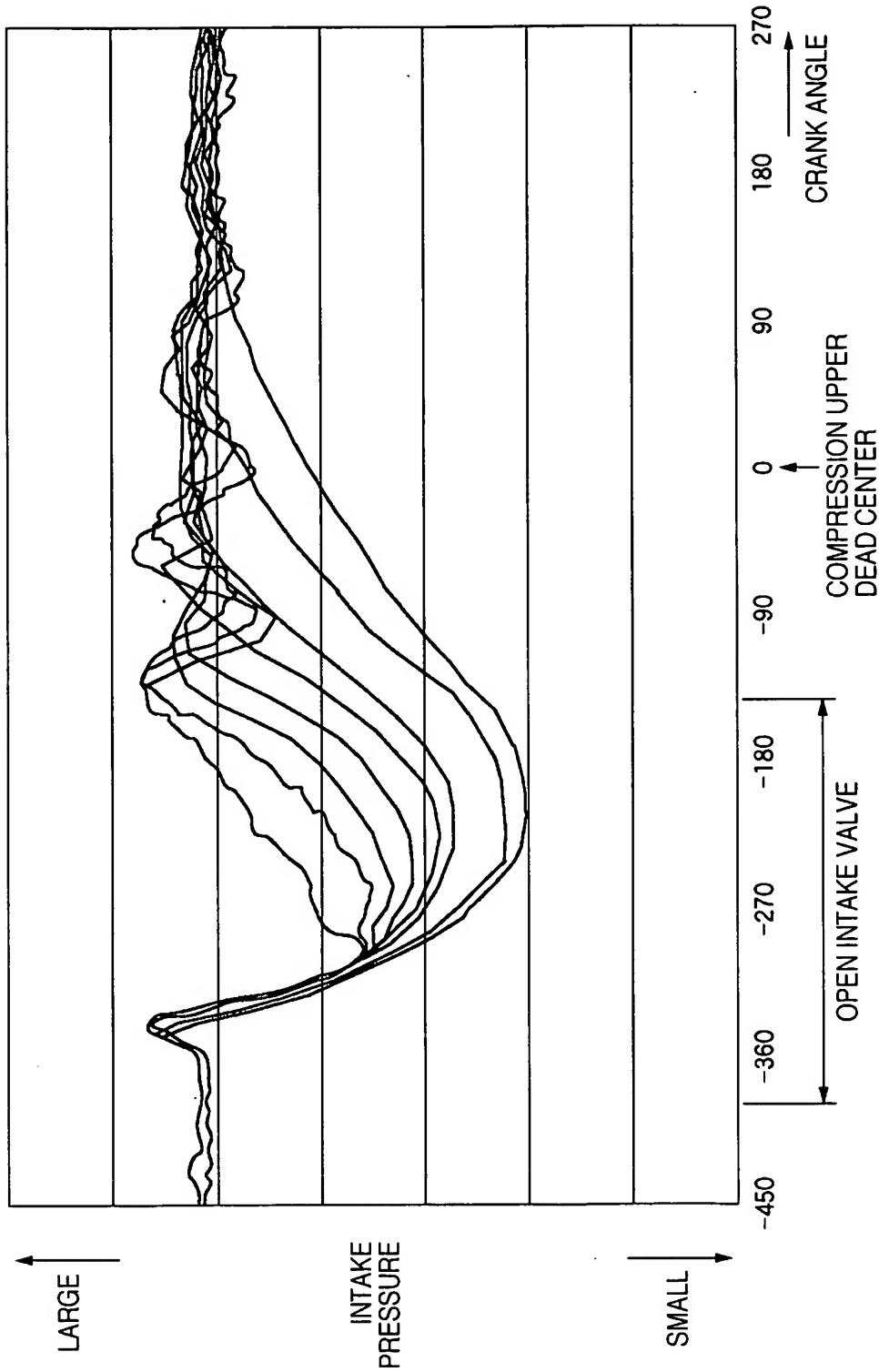
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FIG.2



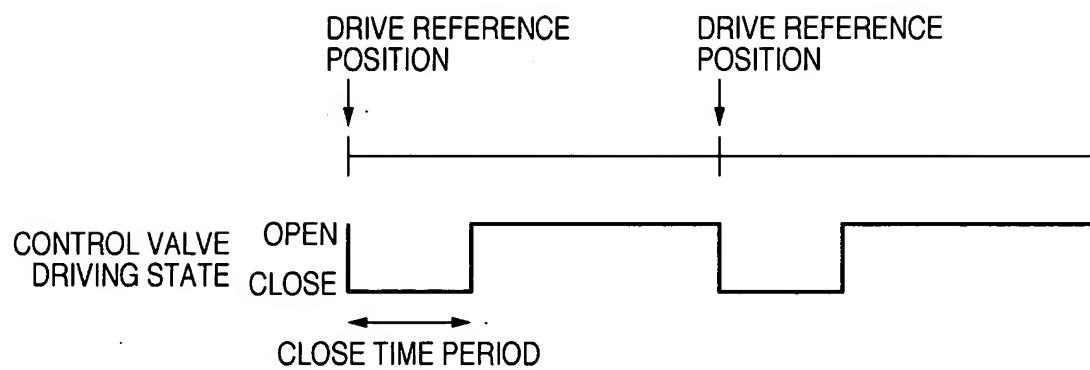
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FIG.3



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FIG.4



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FIG.5

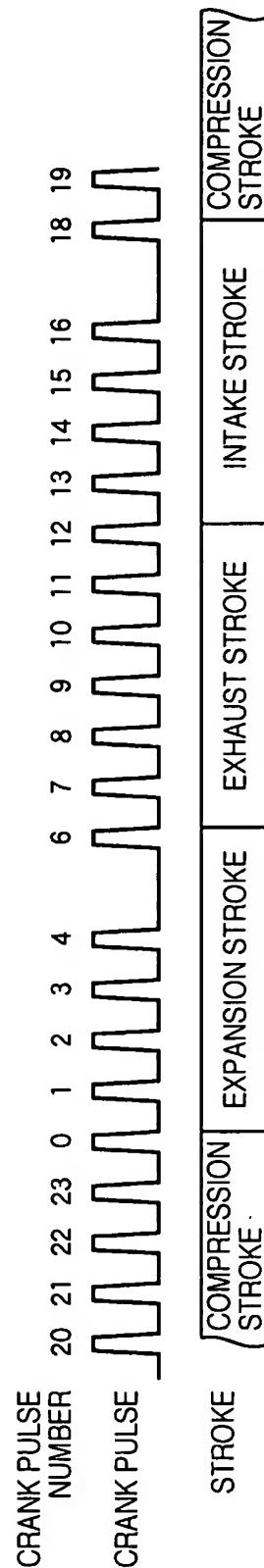


FIG. 6

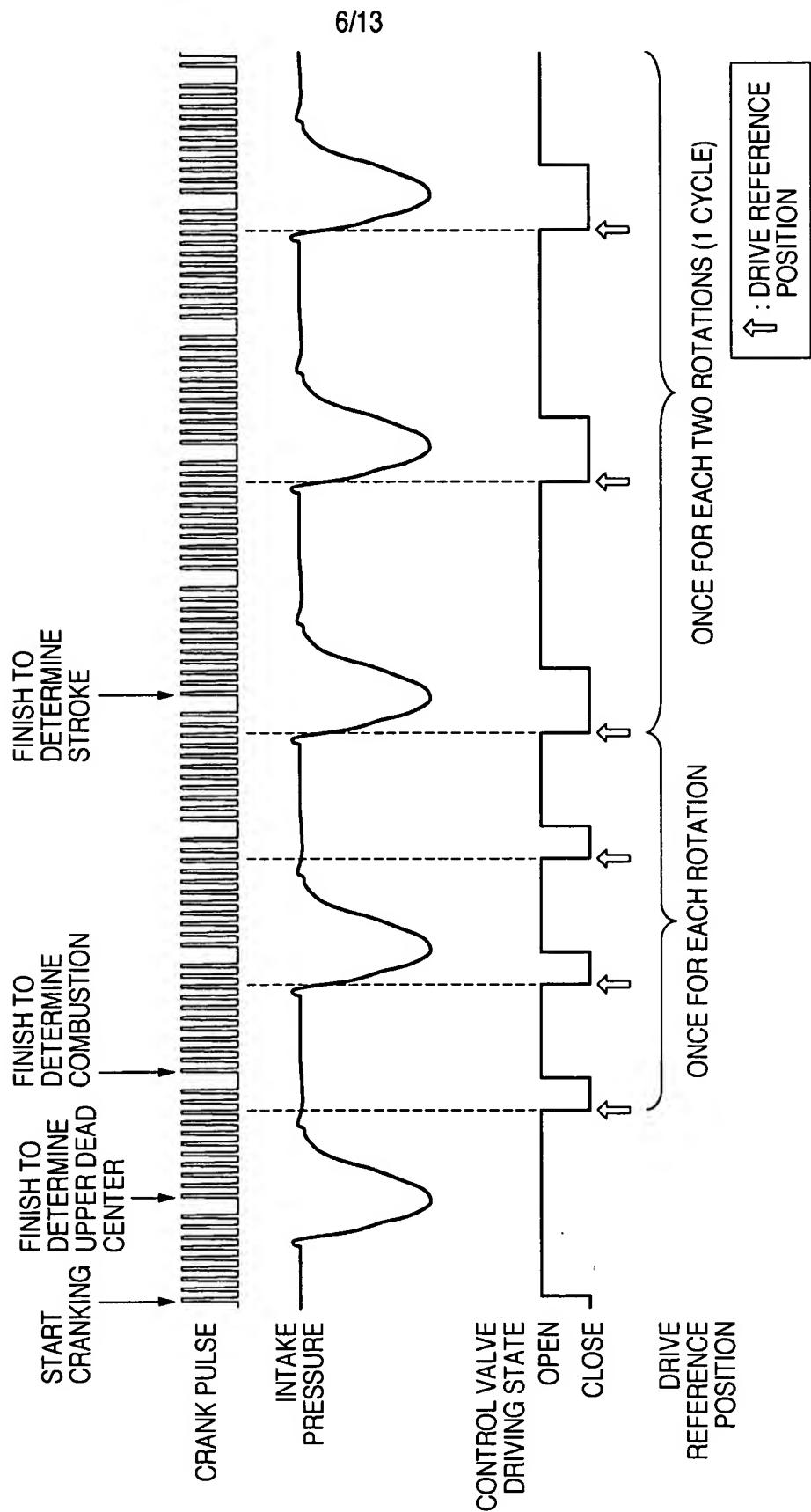


FIG. 7

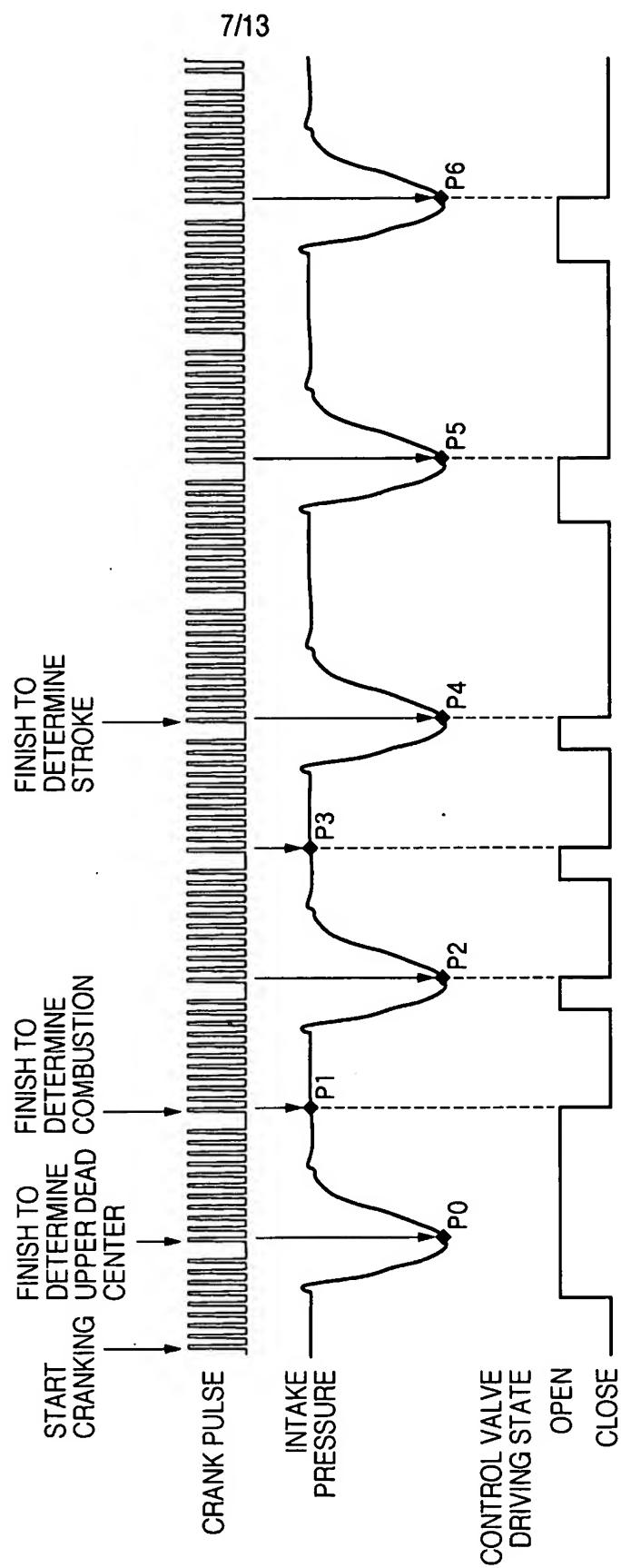


FIG.8

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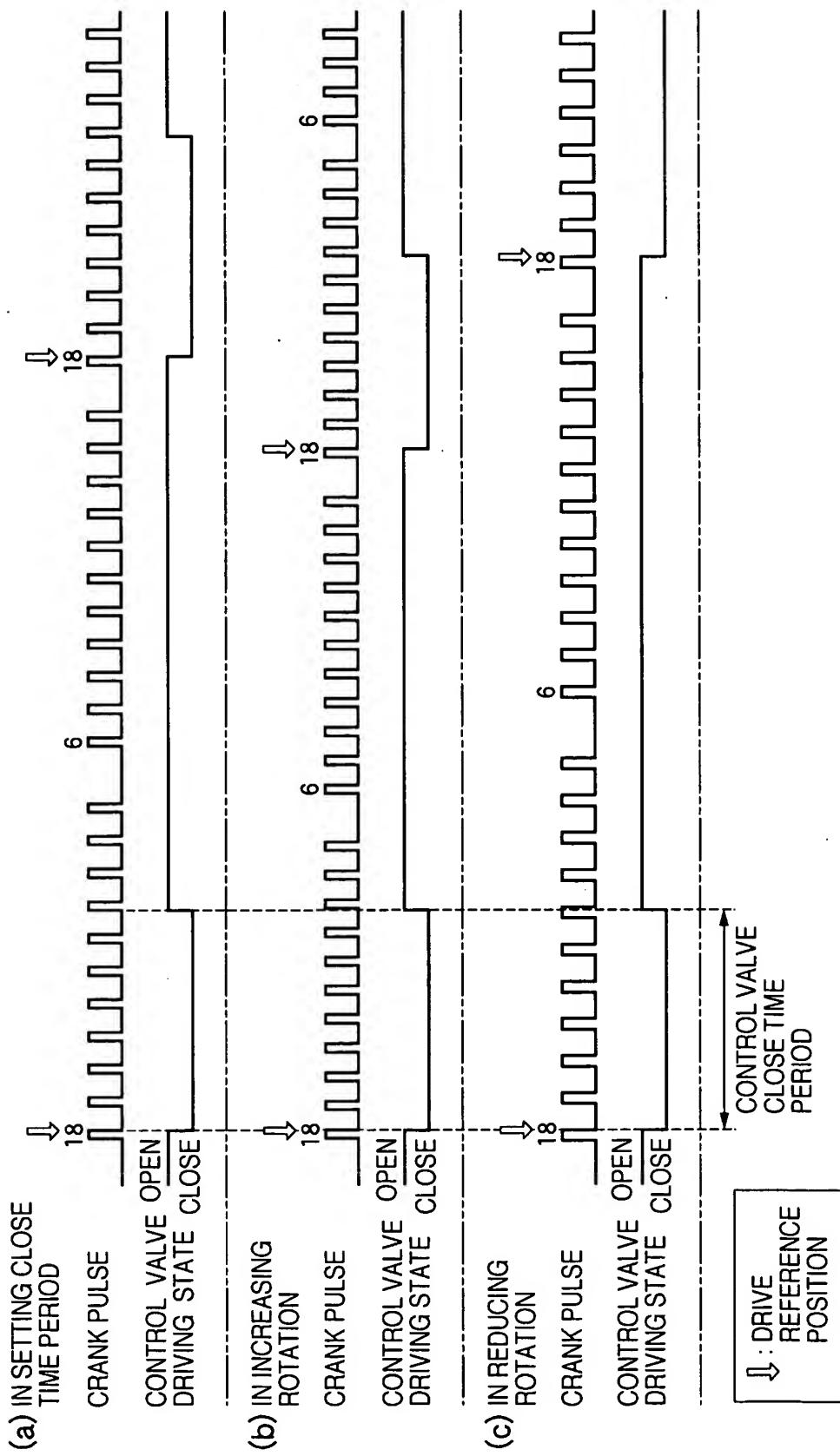
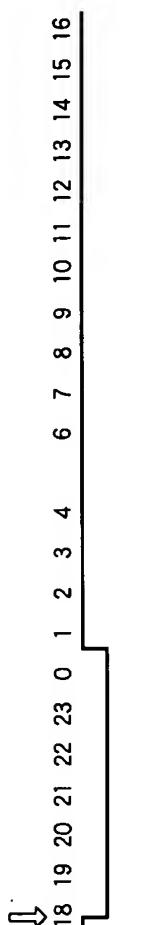
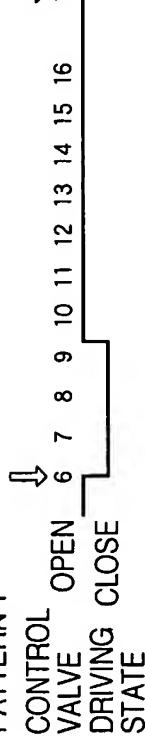


FIG.9

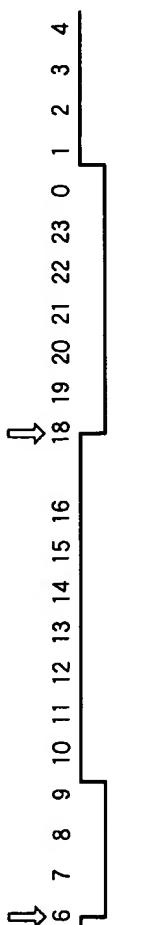
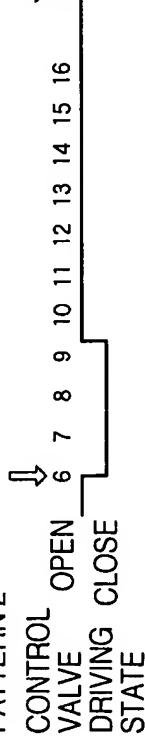
TIMING OF FINISHING TO DETERMINE STROKE

CRANK PULSE 

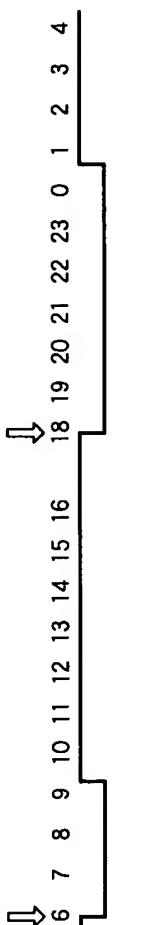
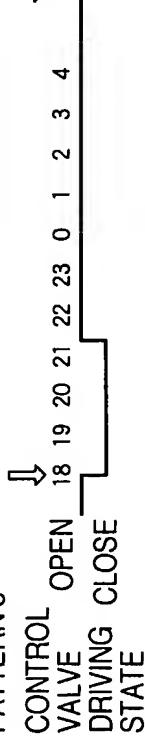
PATTERN 1

CONTROL OPEN  6 7 8 9 10 11 12 13 14 15 16  
VALVE CLOSE  18 19 20 21 22 23 0 1 2 3 4  
DRIVING STATE

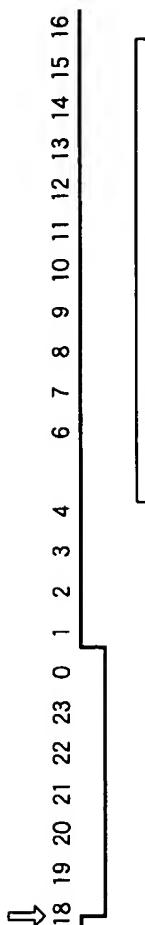
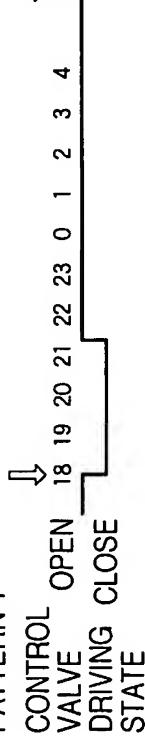
PATTERN 2

CONTROL OPEN  6 7 8 9 10 11 12 13 14 15 16  
VALVE CLOSE  18 19 20 21 22 23 0 1 2 3 4  
DRIVING STATE

PATTERN 3

CONTROL OPEN  6 7 8 9 10 11 12 13 14 15 16  
VALVE CLOSE  18 19 20 21 22 23 0 1 2 3 4  
DRIVING STATE

PATTERN 4

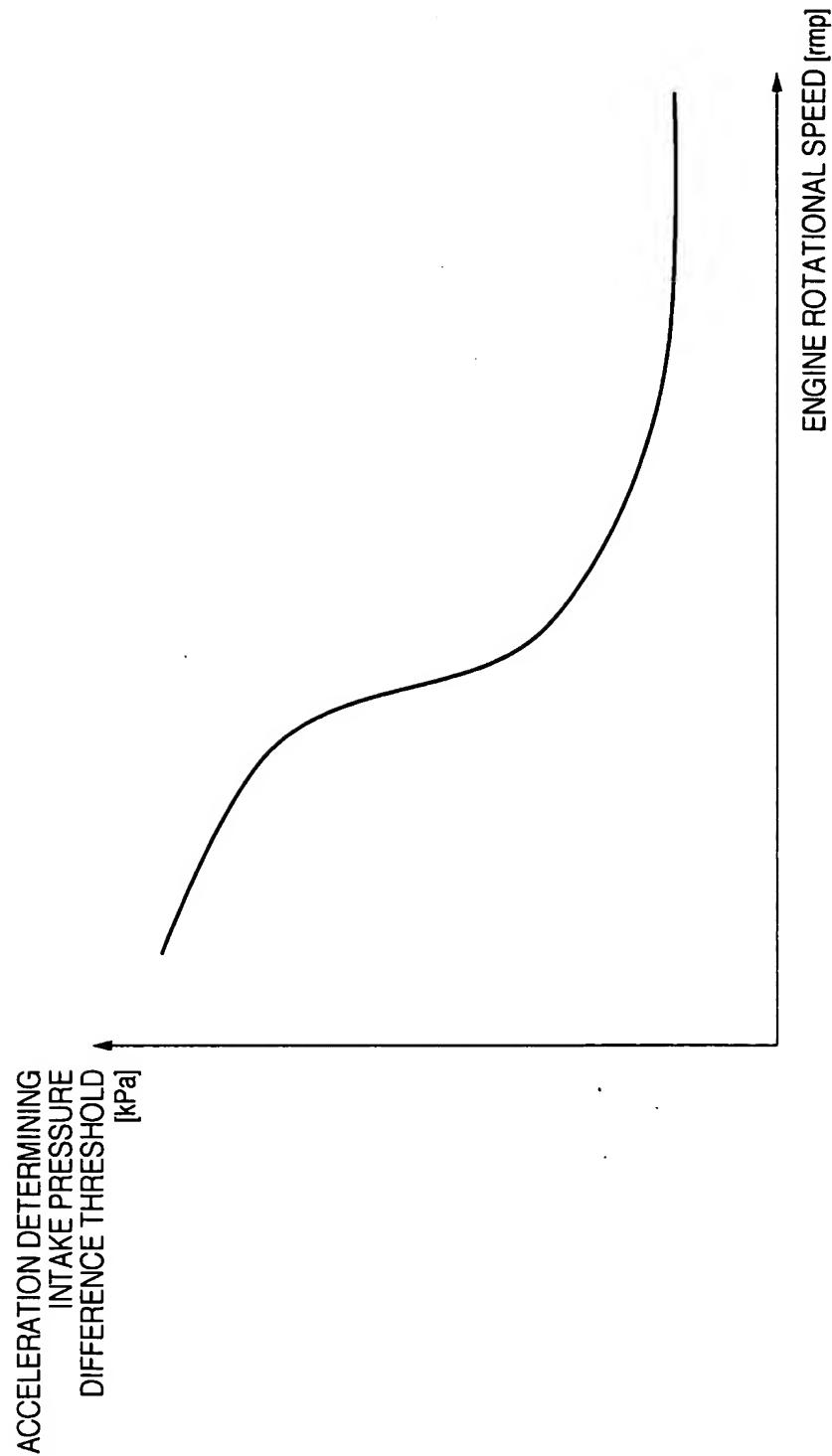
CONTROL OPEN  6 7 8 9 10 11 12 13 14 15 16  
VALVE CLOSE  18 19 20 21 22 23 0 1 2 3 4  
DRIVING STATE

 : DRIVE REFERENCE POSITION

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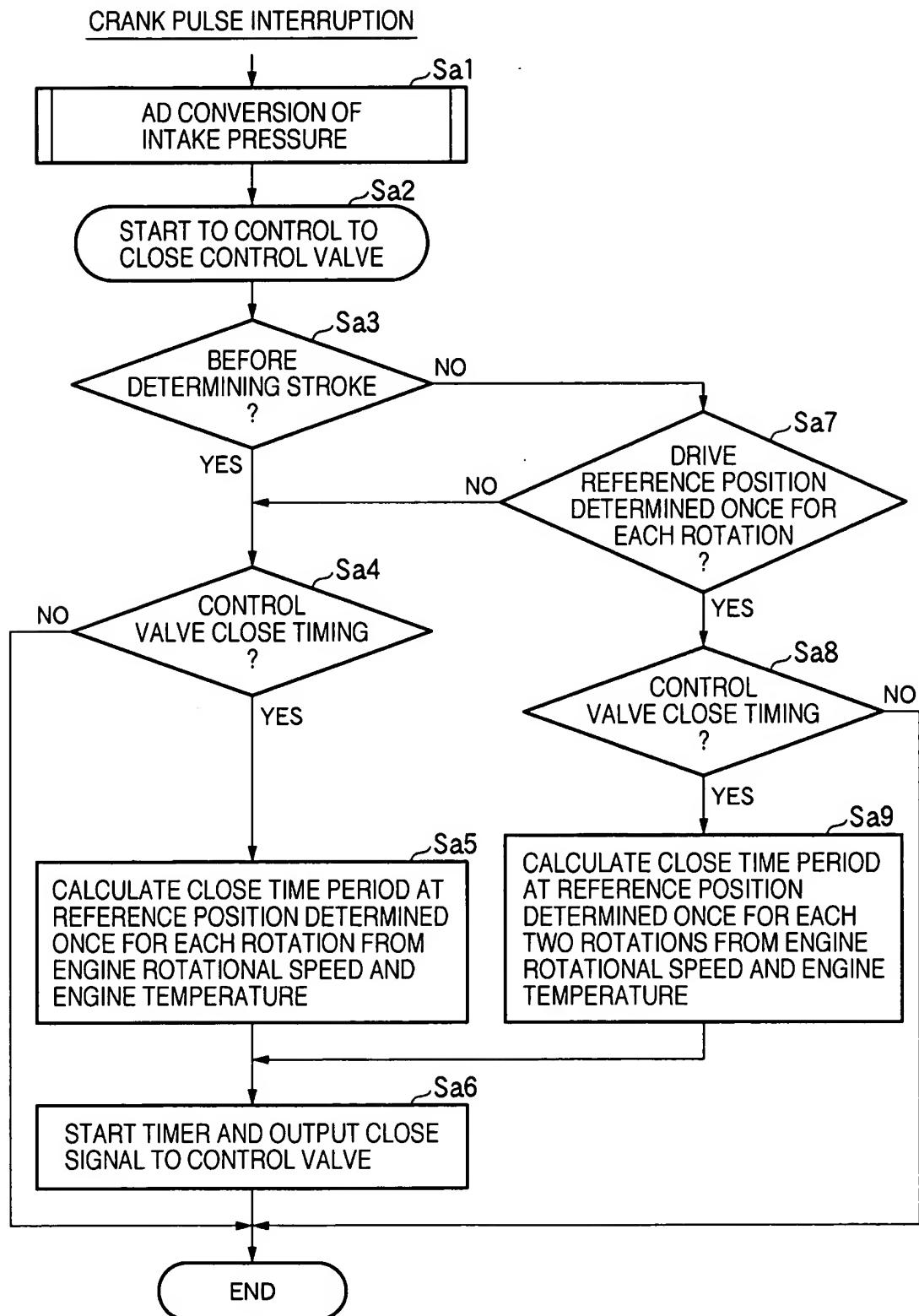
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FIG. 10



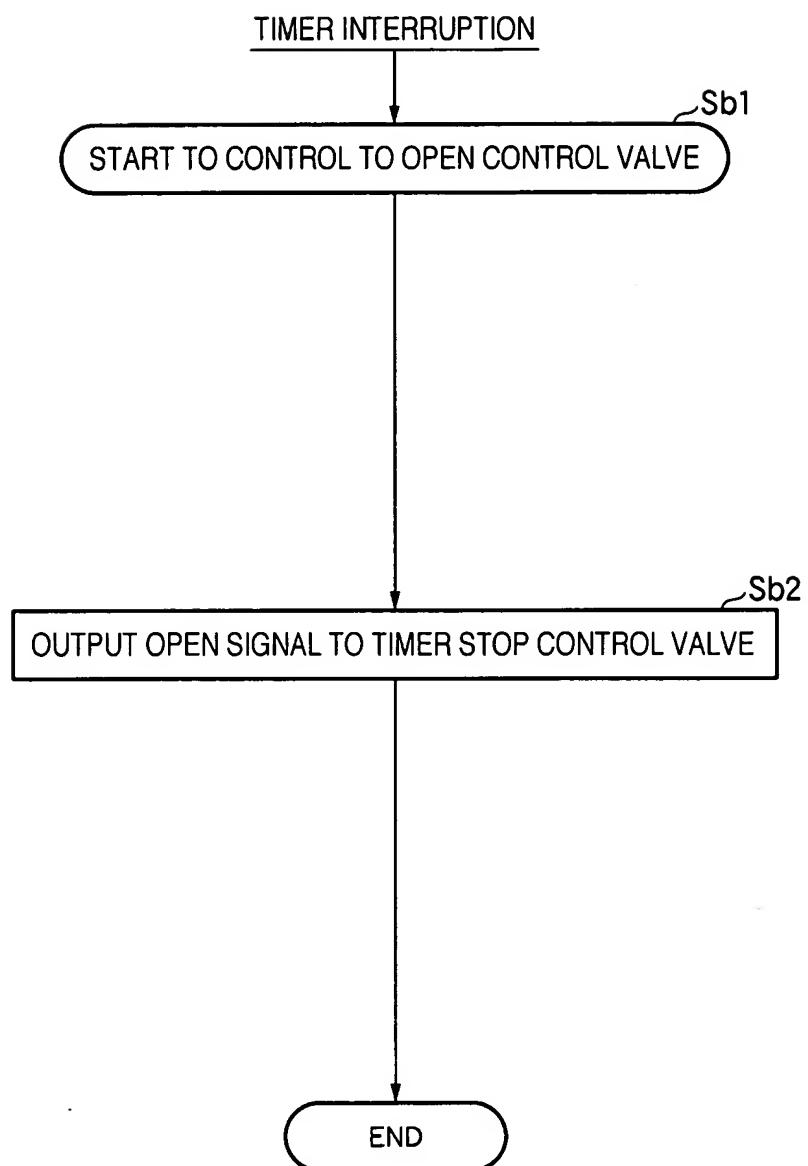
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FIG.11



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FIG.12



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FIG.13

